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ABSTRACT

The relationship between job performance and participation in training courses was examined through a survey of 15,570 individuals who represented those members of the 24,500-member labor force component of the Australian Bureau of Statistics 1993 Survey of Training and Education (STE) who had been employees at some time during the 12 months before the survey. Collectively, the 15,570 individuals interviewed had undertaken 12,744 in-house training courses, and 1,709 had undertaken a total of 2,929 external training courses. Most participants in in-house and external training (85.4% and 84.8%, respectively) stated that training has improved their job performance. Only 6.8% of in-house training participants and 6.0% of external training participants stated that training had not improved their job performance and did not expect that it would. The perception that training improves job performance was slightly higher among females than males and consistently higher among individuals who had completed secondary school or undertaken some postsecondary education than among individuals who had not completed secondary school. Laborers and related workers were significantly less likely to credit training with improving their job performance. Although 24.1% of private sector employees participated in training versus 50.5% of public sector employees, no indication of training saturation was found. (MN)

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CENTRE FOR THE ECONOMICS OF EDUCATION AND TRAINING

PERCEPTIONS OF IMPROVEMENT IN JOB PERFORMANCE BY PARTICIPANTS IN TRAINING COURSES: RESULTS FROM THE 1993 SURVEY OF TRAINING AND EDUCATION

Mike Long

October 1996

WORKING PAPER NO. 11

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Introduction

This paper examines patterns of responses to the question

Has (any of) that training helped you to do a better job?

Differences are considered between the categories of a range of demographic and employment variables for participants and a number of characteristics of the training courses themselves.

The Data

The question was asked in the Australian Bureau of Statistics' (ABS) 1993 *Survey of Training and Education* (STE). The STE was based on the labour force component of the monthly population survey conducted by the ABS in April and May 1993. Face-to-face interviews were used to collect data on a wide range of demographic, labour market, education and training variables from respondents aged from 15 to 64 years.

An effective sample of 12 600 households yielded 24 500 completed interviews. The confidentialised unit-record file (CURF) from which the results in this paper are derived contained information on 20 889 persons and the training courses they had undertaken. The analyses in this paper deal with training courses undertaken during the previous 12 months by those 15 570 respondents who were employees at any time during the 12 months preceding the interview -- a subset which excludes employers, the self-employed, unemployed and those not in the labour force. Two types of training course are considered:

- *In-house training*. This refers to those courses organised by the respondent's employer primarily for their own staff and using the employer's staff or training consultants.

- *External training*. This refers to attendance at a training course organised and conducted by agencies other than the respondent's employer. Study for an educational qualification was excluded from this category.

Results are presented separately for these two types of training courses. Details were recorded for up to four in-house courses and four external courses for each respondent. Of the 15 570 respondents who had been employees in 12 months prior to the survey, 5038 had undertaken at least one in-house training course and, collectively, these individuals had undertaken 12 744 courses. The corresponding values for external training were 2929 courses undertaken by 1709 respondents. It is these two samples -- the 12 744 in-house courses and the 2929 external courses -- which provide the basis for the analyses presented in this paper. Hence the focus of the paper is on courses rather than individuals.

Effective Training

As suggested at the outset, the purpose of this paper is to examine responses to the question

Has (any of) that training helped you to do a better job?

Table 1 ***Has Training Helped You to Do a Better Job?*** **by In-house and External**

Has training helped you to do a better job?	*In-house* %	*External* %
Training has improved job performance	85.4	84.8
Training has not improved job performance, but is expected to	3.8	4.2
Training has not improved job performance and is not expected to	6.8	6.0
Training has not improved job performance and not known if it will	1.2	2.3
Not known if training has improved job performance	2.8	2.8
Total	100.0	100.0
Number of courses	12 744	2929
Positive	89.2	89.0
Not positive	10.8	11.0
Total	100.0	100.0
Number of courses	12 744	2929

Five responses to the question were recorded in the CURF. These five responses, together with the percentage of courses for each response, are shown in Table 1. Examining such values without any basis for comparison is always moot. A positive interpretation would focus on the fact that the overwhelming majority of courses are thought to have helped participants to do their jobs better. Participants claimed that about 85 per cent of both in-house and external training courses had helped them to do a better job. A further 4 per cent of courses were expected to help respondents to do a better job some time in the future. In all then, about 89 per cent of courses were evaluated positively by those who undertook them. There are, however, no international benchmarks or time-series figures against which to compare these results. A negative interpretation might highlight the 11 per cent of courses which were not evaluated positively. These courses either did not help participants to do a better job or participants did not know if the course had or would help them to do a better job. While such courses may involve a substantial waste of resources nationally, it might be a little jaundiced to overlook that they constitute only a small minority of all training courses.

Table 1 provides a second set of values which groups the five separate responses to the question into only two: positive and not-positive. It is this two category variable which is the subject of later analyses.

Productivity

Interest in responses to the question *Has (any of) that training helped you to do a better job?* is based on the assertion that positive responses are a measure of improvements in productivity and non-positive responses indicate an absence of improvement in productivity. It must be admitted that at best only modest claims can be made for such a

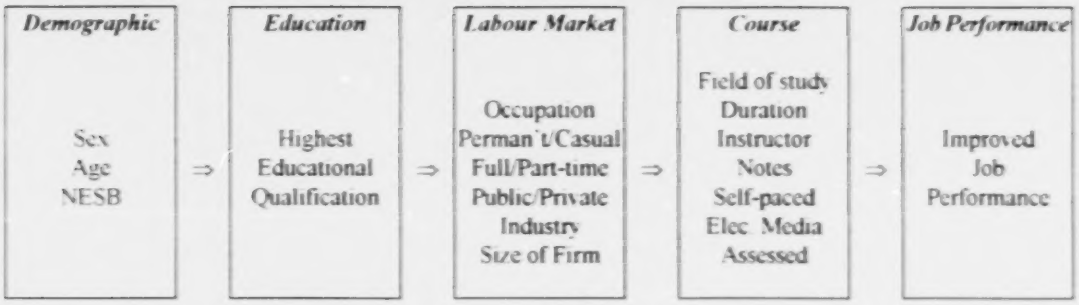

Figure 1 Outline of the Variables Involved in the Analysis

measure. It is based on the assumption that participants' perceptions are valid and that *better* is interpreted in a way that more or less resembles *more productive*. Even if these assumptions are true, it is also very much a minimalist measure. It may indicate whether or not a training course has improved productivity, but it provides no information about the extent of any improvement.

There are other measures of the effects of training on productivity. There is a set of theories linking wages to productivity. Hence if training can be linked to increases in wages, some kind of claim can be made for the effect of training on productivity. The theories themselves specify assumptions about the labour market which must be met in order to link wages and productivity. Even if these assumptions are met, there is still the problem of isolating the effects of training from extraneous factors. Participation in training is not randomly distributed.

Case studies of the effects of training on productivity can also be undertaken. Such studies are usually resource-intensive and therefore small scale. They rely on being able to link specific training courses for specific individuals to increased or improved measurable outputs. It is, however, often not possible to link particular tasks to particular outputs. There may also be difficulties about researcher effects and the extent to which any conclusions can be generalised.

There is no *royal road* to the study of the effects of training on productivity. The approach used here is based on the perceptions of those who undertook the training. As such, it is a contribution to a broader literature which includes studies based on very different approaches to the issue, none of which alone is unproblematic. Collectively, however, such studies may provide an understanding of the extent to which training courses contribute to improvements in productivity and the circumstances under which such improvements can be maximised.

Analysis

The main purpose of this paper is to examine the way in which the contribution of training courses to improved job performance varies across categories of demographic and labour market variables and the characteristics of training courses which contribute to courses being more or less likely to contribute to improvements in productivity. Figure 1 displays the variables used in the analyses and presents them schematically in a causal order from

left to right. The demographic factors, for instance, may influence the variables to the right, but not vice versa. Similarly, job performance on the far right of the figure may be influenced by any of the factors to the left, but is unlikely to influence those factors. Figure 1 is only schematic, but it provides a broad outline of the logic underlying the analyses.

The investigation of survey data on the sources of variation in perceptions of the effect of training courses on job performance calls for multivariate statistical analysis. For instance, investigation of the effect of whether or not a training course is self-paced on participants' perceptions of the efficacy of training requires that any other differences between those undertaking self-paced and not-self-paced courses are removed by statistical adjustment. And when the dependent variable -- job performance -- is a binary variable (improved performance/did not improve performance) the statistical technique of choice is logistic regression. This is the technique which underlies many of the values in Tables 2 and 3.

The Tables

Tables 2 and 3 contain the results for in-house and external training courses. Other than that, the formats of these two tables are identical. Each table contains a substantial amount of information and it will assist the later presentation of the results to first explain the format of the tables. The values for *Sex* from Table 2 will be used as the example.

The left hand side of Table 2 shows the names of the variables and the categories of each. For instance, the first variable is *Sex* with the categories *Male* and *Female*. The second column is headed *Persons* and shows the percentage of persons in the sample in each category. For instance, Table 2 shows that 54.7 per cent of the 15 570 individuals in the sample of employees were male and 45.3 per cent were female. These values sum to *100* for the categories of any given variable. The values in this column for *Course* variables (*field of study* and so on) are missing because values in this column refer to persons rather than to courses. The third column, headed *Receiving Training*, shows the percentage of respondents in that category who attended at least one course. For instance, 30.6 per cent of males attended at least one in-house course while 32.3 per cent of females attended at least one in-house course. The values in this column describe levels of participation in training. This is not the focus of this paper, but provides some contextual information for the interpretation of values for effects on improved job performance.

The columns headed *Courses* and *Improved P'mance* show the percentage of the 12 744 courses which were undertaken by each category for each variable and the percentage of courses which were described by respondents as helping them to do a better job. From Table 2 for instance, 53.5 per cent of the in-house courses were undertaken by males and 46.5 per cent by females. Of the courses undertaken by males, 89.0 per cent were evaluated positively (and, by implication, but not shown in the table, 11.0 per cent were not evaluated positively). Of the courses undertaken by females, 89.3 per cent were evaluated positively (and again, by implication, but not shown in the table, 10.7 per cent were not evaluated positively).

It is these last values which are germane to the main purpose of the paper. For males the percentage of courses improving performance is 89.0, while for females the percentage of

Table 2 Whether In-house Training Has Improved Job Performance: Persons Who Had a Wages or Salary Job in the Last 12 Months

Variable	*Persons*	*Receiving Training*	*Courses*	*Improved P'mance*	*Odds Ratio*	*Odds Ratio*	*Odds Ratio*
	%	%	%	%	(0)	(1)	(2)
Sex							
Male	54.7	30.6	53.5	89.0	-----	-----	-----
Female	45.3	32.3	46.5	89.3	1.03	1.02	1.07
Age							
45-64	24.2	30.3	24.1	88.8	0.89	0.90	0.90
35-44	25.0	37.9	30.9	88.5	0.86	0.87	0.86
25-34	28.2	33.3	30.3	89.7	0.98	0.98	0.96
15-24	22.7	22.7	14.7	89.9	-----	-----	-----
Country of birth							
Australia	75.2	32.5	78.3	89.3	-----	-----	-----
Other English-speaking	12.0	33.3	12.9	89.0	0.97	0.99	1.01
Non-English-speaking	12.8	22.6	8.8	88.5	0.93	0.94	0.88
Education							
Degree or Diploma	21.5	52.6	41.1	88.9	1.20*	1.20*	1.24*
Trade Qualification	14.8	27.4	12.1	89.3	1.25*	1.26*	1.45**
Certificate	11.3	36.8	13.1	90.9	1.49**	1.49**	1.35**
Completed Sec. School	17.9	27.4	14.4	91.0	1.52**	1.50**	1.29*
Not Comp. Sec. School	34.4	20.0	19.2	87.0	-----	-----	-----
Occupation							
Manag & Administrator	6.8	48.2	11.8	93.7	2.85**	2.72**	2.32**
Professional	13.8	54.6	26.9	87.8	1.38*	1.41*	1.34
Para Prof & Technical	7.1	49.2	12.0	89.7	1.67**	1.66**	1.39*
Tradesperson	13.1	20.4	7.8	85.9	1.17	0.97	0.81
Clerk	17.7	34.5	18.2	90.6	1.86**	1.82**	1.63**
Sales & Personal Serv	17.0	28.1	13.9	91.0	1.95**	1.92**	1.67**
Plant & Mach. Operator	7.8	19.5	4.2	84.1	1.02	1.00	0.82
Labourers & Rel. Workers	16.7	11.8	5.1	83.9	-----	-----	-----
Permanent or casual							
Permanent	74.5	37.7	91.5	89.3	1.20	1.27*	0.93
Casual	25.5	12.9	8.5	87.5	-----	-----	-----
Full- or part-time							
Full-time	73.4	35.6	85.1	89.3	1.07	0.98	1.17
Part-time	26.6	19.7	14.9	88.6	-----	-----	-----
Sector of firm							
Private	72.5	24.1	53.0	89.5	1.08	1.03	1.05
Public	27.5	50.5	47.0	88.8	-----	-----	-----
Industry							
Primary Industry	4.3	20.4	2.6	86.2	0.73	0.81	0.87
Manufacturing & Utilities	17.7	23.8	13.1	89.5	-----	-----	-----
Construction	4.9	15.0	1.9	84.5	0.64**	0.66*	0.62*
W'sale & Retail Trade	18.6	22.5	12.0	90.0	1.05	0.85	0.83
T'port, Storage & Comm.	6.2	35.8	6.2	88.5	0.90	0.89	0.81
Finance & Business Serv.	11.2	36.1	13.1	91.1	1.19	0.94	0.93
C'Serv, Pub Ad & Def	28.6	47.2	46.9	88.6	0.91	0.85	1.01
Recr'n, Pers & Oth Serv	8.5	18.5	4.3	90.4	1.11	1.03	1.09

Table 2 Whether In-house Training Has Improved Job Performance: Persons Who Had a Wages or Salary Job in the Last 12 Months (Continued)

Variable	*Persons*	*Receiving Training*	*Courses*	*Improved P'mance*	*Odds Ratio*	*Odds Ratio*	*Odds Ratio*
	%	%	%	%	(0)	(1)	(2)
Firm size - no. employees							
100 or more	59.7	41.7	81.0	89.2	1.11	1.05	1.00
20 - 99	14.2	26.6	11.7	88.5	1.04	0.98	0.98
10 - 19	7.7	13.3	3.0	93.0	1.79**	1.62*	1.71*
Under 10	18.4	9.0	4.4	88.1	-----	-----	-----
Field of study							
Managerial	-----	-----	31.7	89.9	-----	-----	-----
Para Prof & Technical	-----	-----	13.9	91.0	1.17	1.23*	1.25*
Trades	-----	-----	5.3	91.8	1.30	1.70**	1.56**
Office Procedures	-----	-----	4.9	87.0	0.78	0.69**	0.67**
Sales	-----	-----	11.4	91.2	1.21	1.07	1.13
Transport	-----	-----	1.8	93.4	1.67	2.44**	2.13**
Labouring	-----	-----	1.3	85.2	0.68	0.84	0.81
Induction	-----	-----	2.5	86.3	0.74	0.75	0.69*
General Supervisory	-----	-----	2.8	89.9	1.04	1.04	0.97
General Computing	-----	-----	9.2	93.1	1.59**	1.51**	1.29
Health	-----	-----	7.3	79.8	0.47**	0.56**	0.58**
Other	-----	-----	5.3	83.1	0.59**	0.63**	0.61**
Course duration - hours							
More than 40	-----	-----	5.0	94.0	2.53**	2.63**	1.63**
17-40	-----	-----	17.4	93.1	2.18**	2.16**	1.51**
9-16	-----	-----	16.1	91.5	1.74**	1.69**	1.30**
5-8	-----	-----	28.7	88.1	1.20**	1.20**	1.02
1-4	-----	-----	32.8	86.1	-----	-----	-----
Course had instructor							
Yes	-----	-----	92.8	89.4	1.43**	1.52**	1.19
No	-----	-----	7.2	85.5	-----	-----	-----
Course had notes							
Yes	-----	-----	80.0	91.0	2.26**	2.28**	1.87**
No	-----	-----	20.0	81.8	-----	-----	-----
Course was self-paced							
Yes	-----	-----	13.1	91.7	1.39**	1.34**	1.32**
No	-----	-----	86.9	88.8	-----	-----	-----
Course used elect. media							
Yes	-----	-----	62.3	90.6	1.48**	1.50**	1.27**
No	-----	-----	37.7	86.7	-----	-----	-----
Course was assessed							
Yes	-----	-----	29.1	93.0	1.90**	2.08**	1.62**
No	-----	-----	70.9	87.6	-----	-----	-----

See *Notes to Tables*

courses improving performance is 89.3. Hence training is more efficacious for females. Of course this difference is extremely small and not statistically significant.

The next columns headed *Odds Ratios (0), (1)* and *(2)* are a little more complex. The reason for introducing the idea of odds ratios is that these are the (more readily interpretable) statistics produced by logistic regression -- and given that the dependent variable, job performance, is binary, logistic regression is the method of choice. Odds ratios are a deceptively simple statistic. They are always computed in regard to some base category. The choice of base is quite arbitrary, but in Tables 2 and 3 *Male* has been selected as the base category for *Sex*, and hence the odds ratios are calculated for *Female* compared with *Male*. The values in the column headed by *Odds Ratio (0)* are derived directly from the values in the preceding column. The odds of a positive training outcome for females are 89.3/10.7 = 8.3458. The odds of a positive outcome for males are 89.0/11.0 = 8.0909. Hence the odds ratio of females to males is 8.3458/8.0909 = 1.03 which is the value shown in Table 2.

Odds ratios will be 1 when there is no difference between the category of interest (Female) and the base category (Male), greater than one if the odds are higher for the category of interest than for the base category (Females are more likely to have improved job performance than males) or less than one if the odds are lower for the category than the base category (Females are less likely to have improved job performance than males). There is an important asymmetry to note in the odds ratios. Odds ratios indicating positive effects are unbounded i.e. they can extend from 1 to positive infinity. Odds ratios indicating negative effects can only range from 1 to zero. Hence the negative reflection of an odds ratio of say 1.5 is not 0.5 but rather 1/1.5 = 0.67.

The translation between percentage values and odds-ratios is transparent when there is only one prediction variable. This is what is happening in the first column of odds ratios. Each variable is being used one at a time to predict improvement in job performance. The translation between percents and odds ratios is far less transparent when more than one variable at a time is used to predict some outcome variable. This is the case in the columns headed by *Odds Ratio (1)* and *Odds Ratio (2)*. The right-most column shows odds ratios controlled for all other variables in the table. Hence the value *1.07* is the odds ratio for positive training outcomes for females compared with positive training outcomes for males, controlling for (or holding constant the effects of) *Age, Country of birth, . . ., Course was assessed.*

The values in the column headed by *Odds Ratios (1)* are also adjusted odds ratios, but the set of variables by which they are adjusted is determined more or less by the schema presented in Figure 1. The odds ratios in this column are adjusted for all other variables in the same group as itself and any variables to its left in Figure 1. The odds ratios in this column for the variables in the *Course* group are only adjusted for variables to the left in Figure 1 and not for other variables in this group.

In-house Training Courses

Table 2 presents the results for the effect of in-house training courses on improvements in job performance for the variables listed in Figure 1. It is important to make one point about these results at the outset. A glance down the column headed by *Improved P'mance*

shows only small variations between the percentage of courses leading to improvement in job performance across the categories of the different variables. The overall mean (from Table 1) is 89.2 per cent, the highest value is around 94 per cent and the lowest around 80 per cent. These are not huge differences. It is also possible to compare the values in this column with those in the next column, headed by *Odds Ratio (0)*, to generate some intuitive idea of what constitutes a reasonable size for an odds ratio in the context of these results. The *Education* category of Certificate has an odds ratio of 1.49 compared with *Not Completed Secondary School*. The percentage difference is nearly four percentage points (90.9-87.0 = 3.9) which, while small, might be taken as a minimum difference to attract attention. Hence odds ratios of around 1.5 and greater (or 0.67 or less) might be taken as indicating substantial differences and worthy of comment -- even though some smaller odds ratios are statistically significant. The subsequent discussion employs this criterion.

Demographic Variables The odds ratios for the demographic variables show no differences of any substance between categories and hence no relationship between the sex, age or country of birth of the participant and the likelihood of the in-house training course contributing to improved job performance. In some contexts the absence of a relationship can be important. For instance, the lower participation in training of persons from a non-English-speaking background is well documented. These results suggest that this is unlikely to be due to any lower level of usefulness of training courses for this group.

Education The differences between categories of education are consistently statistically significant. The likelihood of improvement in job performance for a course undertaken by participants who completed secondary school or undertook some postsecondary education is higher than for participants who did not complete secondary school and undertook no further education -- though not by a great deal. Participants with a trade qualification had the greatest likelihood of a positive training outcome after adjustment for the effect of other variables.

Labour Market Variables There are some quite substantial differences in the efficacy of training between occupational categories. Compared with *Labourers and Related Workers*, the *Managers and Administrators*, *Para-Professional and Technical*, *Clerical* and *Sales and Personal Services* categories had substantially higher levels of training efficacy. These differences generally hold even after adjustment for the effects of other variables, although the effect associated with the *Para-professional and Technical* category is only modest after adjustment.

There is no effect of permanent or casual employment, full-time or part-time employment or sector of employment of the participant on the likelihood that an in-house training course will improve job performance. This is particularly interesting in the case of sector of employment for which there are quite large differences in the extent to which employees in the two sectors participate in training -- 24.1 per cent for the private sector and 50.5 per cent for the public sector. Yet there is no indication of *training saturation*. The odds of a participant employed in the private sector responding positively about their training course is little different from the corresponding odds for a participant employed in the public sector.

Table 3 Whether External Training Has Improved Job Performance: Persons Who Had a Wages or Salary Job in the Last 12 Months

Variable	*Persons*	*Receiving Training*	*Courses*	*Improved P'mance*	*Odds Ratio*	*Odds Ratio*	*Odds Ratio*
	%	%	%	%	(0)	(1)	(2)
Sex							
Male	54.7	10.6	54.2	89.1	-----	-----	-----
Female	45.3	10.6	45.8	88.8	0.97	1.00	0.78
Age							
45-64	24.2	10.3	25.0	89.5	1.64	1.63*	1.87**
35-44	25.0	13.3	31.3	91.2	1.98	1.98**	2.05**
25-34	28.2	12.1	31.8	88.2	1.43	1.43*	1.56*
15-24	22.7	6.3	12.0	83.9	-----	-----	-----
Country of birth							
Australia	75.2	11.3	79.2	88.8	-----	-----	-----
Other English-speaking	12.0	10.9	12.8	89.4	1.06	1.00	0.94
Non-English-speaking	12.8	6.3	8.0	90.0	1.10	1.07	1.18
Education							
Degree or Diploma	21.5	23.3	50.4	90.0	1.34	1.27	1.09
Trade Qualification	14.8	9.5	11.9	86.7	0.96	0.97	1.06
Certificate	11.3	12.0	12.5	88.0	1.09	1.07	0.97
Completed Sec. School	17.9	7.2	11.5	89.8	1.30	1.44	1.38
Not Comp. Sec. School	34.4	4.6	13.7	87.1	-----	-----	-----
Occupation							
Manag & Administrator	6.8	20.6	13.8	90.2	2.77**	2.44**	1.83
Professional	13.8	26.1	36.2	88.8	2.37**	1.95*	1.54
Para Prof & Technical	7.1	15.3	10.6	91.0	3.04**	2.79**	2.40*
Tradesperson	13.1	6.5	6.8	85.3	1.74	2.03*	1.56
Clerk	17.7	8.6	13.5	88.7	2.35**	2.54**	2.37*
Sales & Personal Serv	17.0	8.3	13.5	93.1	4.04**	3.98**	3.40**
Plant & Mach. Operator	7.8	4.3	2.3	80.3	1.22	1.49	1.72
Labourers & Rel. Workers	16.7	2.6	3.4	76.9	-----	-----	-----
Permanent or casual							
Permanent	74.5	12.6	87.1	89.0	1.06	1.24	1.14
Casual	25.5	5.0	12.9	88.4	-----	-----	-----
Full- or part-time							
Full-time	73.4	12.1	82.4	88.9	0.97	0.94	0.93
Part-time	26.6	6.5	17.6	89.2	-----	-----	-----
Sector of firm							
Private	72.5	9.2	63.9	89.0	1.00	1.21	1.15
Public	27.5	14.4	36.1	88.9	-----	-----	-----
Industry							
Primary Industry	4.3	7.8	3.3	90.9	2.43**	3.03**	3.05**
Manufacturing & Utilities	17.7	7.7	10.9	80.4	-----	-----	-----
Construction	4.9	7.9	3.4	86.6	1.58	1.68	1.90
W'sale & Retail Trade	18.6	7.7	13.3	90.5	2.32**	1.94**	1.73*
T'port, Storage & Comm.	6.2	7.9	4.3	86.7	1.59	1.45	1.47
Finance & Business Serv.	11.2	13.3	15.6	92.7	3.10**	2.93**	2.85**
C'Serv, Pub Ad & Def	28.6	16.1	44.3	89.7	2.13**	2.27**	2.51**
Recr'n, Pers & Oth Serv	8.5	6.3	4.9	87.4	1.69	1.97*	2.22*

Table 3 Whether External Training Has Improved Job Performance: Persons Who Had a Wages or Salary Job in the Last 12 Months (Continued)

Variable	*Persons*	*Receiving Training*	*Courses*	*Improved P'mance*	*Odds Ratio*	*Odds Ratio*	*Odds Ratio*
	%	%	%	%	(0)	(1)	(2)
Firm size - no. employees							
100 or more	59.7	11.5	63.4	89.1	0.81	0.80	0.84
20 - 99	14.2	12.3	16.7	87.1	0.67	0.60*	0.64
10 - 19	7.7	8.4	6.1	87.4	0.69	0.66	0.68
Under 10	18.4	7.4	13.9	91.0	-----	-----	-----
Field of study							
Managerial	-----	-----	36.0	92.5	-----	-----	-----
Para Prof & Technical	-----	-----	12.4	91.8	0.97	0.95	0.97
Trades	-----	-----	6.7	88.9	0.71	1.05	1.04
Office Procedures	-----	-----	2.9	77.8	0.32**	0.36*	0.34*
Sales	-----	-----	10.8	92.2	1.05	0.93	0.93
Transport	-----	-----	1.5	87.9	0.64	0.88	0.81
Labouring	-----	-----	0.7	48.3	0.08**	0.10**	0.09*
Induction	-----	-----	0.5	90.5	0.83	0.86	0.79
General Supervisory	-----	-----	1.7	85.4	0.54	0.56	0.52
General Computing	-----	-----	11.8	89.5	0.77	0.78	0.67
Health	-----	-----	4.3	75.3	0.27**	0.27**	0.23**
Other	-----	-----	10.1	81.0	0.43**	0.45**	0.43**
Course duration - hours							
More than 40	-----	-----	6.4	84.0	0.73	0.85	0.81
17-40	-----	-----	22.5	89.7	1.21	1.38	1.38
9-16	-----	-----	20.8	90.1	1.26	1.42	1.43
5-8	-----	-----	27.6	89.5	1.18	1.23	1.18
1-4	-----	-----	22.7	87.8	-----	-----	-----
Course had instructor							
Yes	-----	-----	95.0	89.2	1.55	1.63*	1.75*
No	-----	-----	5.0	84.2	-----	-----	-----
Course had notes							
Yes	-----	-----	82.6	89.3	1.23	1.31	1.16
No	-----	-----	17.4	87.2	-----	-----	-----
Course was self-paced							
Yes	-----	-----	14.1	88.1	0.91	0.94	1.14
No	-----	-----	85.9	89.1	-----	-----	-----
Course used elect. media							
Yes	-----	-----	62.5	89.6	1.18	1.16	1.10
No	-----	-----	37.5	87.9	-----	-----	-----
Course was assessed							
Yes	-----	-----	28.1	88.0	0.88	1.04	1.13
No	-----	-----	71.9	89.3	-----	-----	-----

See *Notes to Tables*

Employment in the construction industry is associated with relatively low odds of positive training outcomes compared not only with the base category of *Manufacturing & Utilities*, but also with *Community Service, Public Administration & Defence* and *Recreation and Personal & Other Service*. This is the case even after adjustment for differences in other characteristics between industries. Respondents employed in firms with between 10 and 19 workers reported higher levels of positive outcomes from training than respondents employed in smaller or larger firms.

Course Characteristics There is considerable variation between in-house courses with different fields of study in the likelihood to which the course is perceived as contributing to improved job performance. The single largest category of courses (31.7 per cent) is courses about management. This is used as the base. Courses about trades and transport are more likely than managerial courses to yield positive outcomes. Courses about office procedures, induction courses, occupational health and safety courses and other courses are less likely to be perceived as contributing to improvement in job performance.

There is evidence that the longer the course, the more likely it is to be associated with a positive outcome. There might be some concern, though, that after controlling for other variables, there is no difference between courses of 1 to 4 hours duration and courses of 5 to 8 hours duration.

A group of variables addresses the way in which the course was taught -- whether there was an instructor, whether notes were distributed, whether the course was self-paced, whether any electronic media were used in presenting materials and whether or not the course was assessed. Controlling for all other effects, course notes and assessment had the largest effects, although there is some evidence of positive effects of the other variables.

External Training Courses

Table 3 presents the results for the effect of external training courses on improvements in job performance for the variables listed in Figure 1. This table is based on fewer courses than Table 2 and hence only somewhat larger odds ratios are statistically significant. Examination of the values in Table 3 shows that odds ratios of about 2.0 or larger or of about 0.5 or smaller are statistically significant at the five percent level. Given the relatively smaller number of courses on which this table is based, the five per cent criterion for statistical significance is used rather than the one per cent level used for Table 2). The discussion about the size of odds-ratios for Table 2 indicates that odds ratios of this size can be considered substantial. In the following discussion of Table 3, therefore, attention is given to odds-ratios of about two or greater and of about 0.5 or less.

Demographic Variables As for in-house courses, there is little evidence of any effect of the participant's sex or country of birth on the likelihood of improved job performance resulting from an external course. There is, however, some indication that younger participants (15-24 year-olds) have a lower probability of claiming a positive outcome for external training courses than older participants -- even after adjusting for other differences.

Education There is no indication of any greater positive outcome of training being associated with participants with different levels of educational qualification. In particular,

the positive effects of in-house courses associated with participants with certificates or trade certificates is not evident for external training courses.

Labour Market Variables. There are indications that almost all occupational categories reported in Table 3 have a higher likelihood of a positive outcome from external training courses than for *Labourers and Related Workers*. The categories with the highest likelihood are para-professionals and technical workers, clerical workers and sales and personal service workers.

There is no effect of permanent or casual employment, full-time or part-time employment or sector of employment of the participant on the likelihood that an external training course will improve job performance. The comments made in regard to in-house course are also relevant here.

For external courses, participants from the *Manufacturing & Utilities* category appear to have the lowest likelihood of believing that their course improved their job performance. The highest likelihood of a positive outcome is for the *Wholesale & Retail Trade*, the *Finance & Business Services*, the *Community Service, Public Administration & Defence* and the *Recreation, Personal & Other Services* categories. Contrary to the pattern for in-house courses, there is no indication of an especially low likelihood of improvement in job performance for the construction industry. There are, however, some indications that participants from the smallest firms (fewer than ten workers) may have a greater likelihood of positive outcomes for external training courses.

Course Characteristics. External courses in office practice, labouring, occupational health and safety and the *other* category appear to have relatively lower likelihoods of positive training outcomes than managerial courses. Interestingly, the encouraging pattern observed for in-house courses of a positive relationship between duration of course and likelihood of improvement in job performance is not repeated for external courses.

The group of variables which relates to the way in which the course was taught -- whether there was an instructor, whether notes were distributed, whether the course was self-paced, whether any electronic media were used in presenting materials and whether or not the course was assessed -- shows little effect on training outcomes, with the possible exception of an improved outcome associated with having an instructor.

Discussion

The overwhelming majority (89 per cent) of participants in in-house training courses and external training courses considered that their course(s) had or would help them to do a better job. There was some variation in this perception between categories of demographic, educational and labour market variables. There were, however, somewhat different patterns of effects for in-house and external courses.

For in-house courses, the availability of notes and the requirement of some form of assessment was associated with a greater likelihood of the course being perceived as contributing to improved job performance. For external courses, however, these were not crucial factors.

There are (at least) two possible effects which might be expected to be observed for the relationship between levels of participation in training and the extent to which courses are perceived as contributing to improvements in job performance. First, if some groups are genuinely more likely to benefit from training than other groups, then their level of participation should be higher and so too should the likelihood of their perceiving some improvement in their job performance. This is not evident in the results presented in Tables 2 and 3. Second, it may be argued that there are declining returns to ever greater participation rates in training -- there may be some saturation effect. If this is the case, then those groups who benefit more from training will have higher participation rates in training up to levels at which the likelihood of positive outcomes from training is similar for all groups. There is sufficient variation between categories in Tables 2 and 3 to suggest that this is not the case either. On one view, this may suggest that the distribution of training between various categories of individuals has little to do with the extent to which they are likely to benefit from it. It may be, however, that the failure to observe either of these patterns simply reflects the relatively blunt measure of returns to training provided by participants perceptions of whether that training improved their job performance.

A major correlate of training efficacy is the extent of training undertaken. Individuals who undertake more hours of training are more likely to believe that the training has improved job performance. The proposition that individuals who believe that training courses improve their job performance are more likely to undertake further training is plausible. Given the likely direction of this effect, the relationship between total hours of training and perceived efficacy of training was not considered in the analyses in this paper.

Notes to Tables

Tables 2 and 3

1 Values are for persons in salary or wages employment anytime in the previous 12 months.

2 The dependent variable is whether the participant in an in-house (external) training course believes that the course has helped or will help him or her to do a better job (job efficiency).

3 Labour force variables such as *occupation* and *industry* are for the main employer in the 12 months preceding interview. For respondents with more than one employer, training courses may have been undertaken with another employer. Hence there is some *slippage* between reported training courses and labour force characteristics.

4 *Respondents* Percent of respondents in each category (N=15 570). There are no values for those characteristics which refer to the nature of courses rather than to the nature of respondents.

5 *Receiving Training* Percent of respondents participating in at least one in-house (external) training course during the preceding 12 months. There are no values for those characteristics which refer to the nature of courses rather than to the nature of respondents.

6 *Courses* Percent of courses in each category (N=12 744 for Table 2, N=2 929 for Table 3).

7 *Improve Performance* Percent of courses which participants believe helped them to do a better job.

8 *Odds Ratio (0)* The probability of a course improving job efficiency for that category compared to the probability of a course improving job efficiency for the base category *without allowing for the effect of any other variables*. The base category for each variable has the entry ----.

9 *Odds Ratio (1)* The probability of a course improving job efficiency for that category compared to the probability of a course improving job efficiency for the base category *with the effect of all other prior or concomitant variables in the table held constant*. The base category for each variable has the entry ----. Values for variables relating to course characteristics are adjusted only for prior variables.

10 *Odds Ratio (2)* The probability of a course improving job efficiency for that category compared to the probability of a course improving job efficiency for the base category with the effect of all other variables in the table held constant. The base category for each variable has the entry ----.

11 Values statistically significant at 0.01 are indicated by ** while values statistically significant at 0.05 are indicated by *.